NEWS! From the NAVAL OBSERVATORY

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U.S. Naval Observatory
Press Release

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FOR IMMEDIATE RELEASE

USNO KNOWS WHERE THE STARS ARE

The United States Naval Observatory (USNO) has officially released the Second Edition of the USNO CCD Astrograph Catalog (UCAC2), the most astrometrically precise star catalog ever produced by ground-based instrumentation. UCAC2 comprises over 48 million stars with brightness ranges from 8th to a limit of 16th magnitude and covers about 85 percent of the entire sky from the south celestial pole to a declination of about +40 degrees, with some areas covered to about +52 degrees. It is the latest edition of an ongoing project that will be completed in 2005.

Astronomers measure the sky in terms of angular degrees, minutes, and seconds of arc. The apparent size of the disc of the Full Moon is approximately 30 arcminutes, or one-half of a degree. The apparent size of the disc of Mars at the upcoming opposition (the closest in recorded history) will be just over 25 arcseconds, slightly less than one-half an arcminute. One arcsecond is the apparent size that a U.S. penny coin would appear if it were viewed from a distance of about one mile (2 kilometers).

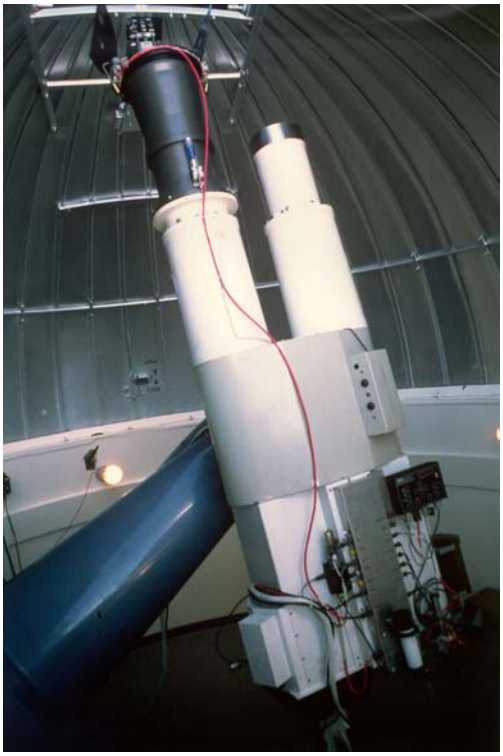
The positions of the faintest stars in the UCAC2 are known to an error of 70 milliarcseconds ("mas", or 70 thousandths of a second of arc), which would be equivalent to the width of the "I" in the word "LIBERTY" on our penny a mile away. The positions of the brighter stars increase in precision to about 20 mas, better than those produced by the European Hipparcos satellite for its 2.5 million star Tycho-2 Catalog. In addition, data on the colors of the UCAC2 stars (known as "photometry") is based in the reference photometry of the 2-Micron All Sky Survey (2MASS), a collaborative program of which USNO is one of several partners.

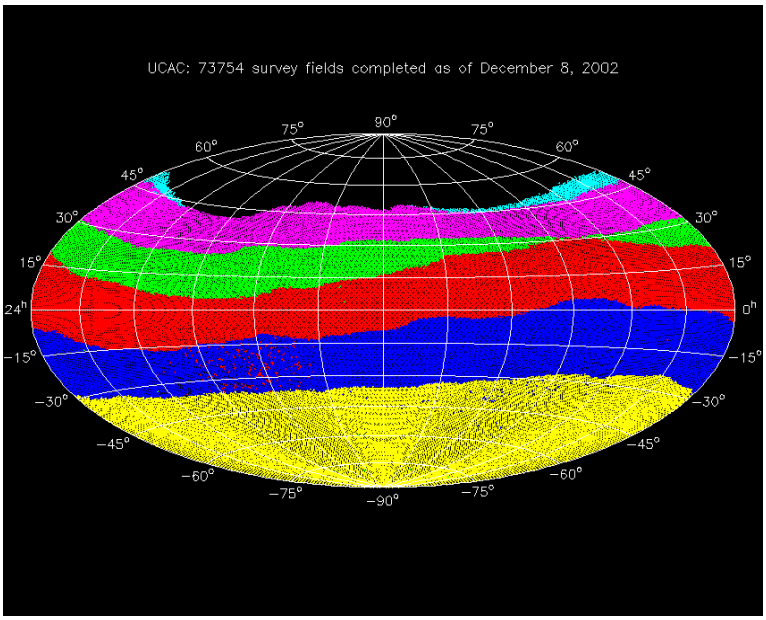
The observations for the UCAC2 are being conducted with a modified 8-inch (20-centimeter) aperture telescope that uses a 4096 x 4096 pixel Charge-Coupled Device, or CCD. The telescope is now completing observations of the northern hemisphere sky from the USNO's dark-sky station near Flagstaff, AZ. Prior to its move to Flagstaff, the telescope spent three years observing the southern hemisphere sky from Cerro Tololo Inter-American Observatory in Chile, taking advantage of the clear, steady air offered at that site.

The raw data for the UCAC2 has been compiled from nearly 250,000 overlapping CCD frames and contains over 4 terabytes (4×10^{12}) of compressed image data.

By measuring so many stars with such precision, it is possible to re-examine older photographic star catalogs to determine the "proper motions" of the stars on the plane of the sky. Proper motions have been obtained for all the stars in the catalog.

The UCAC2 is being distributed on three CD-ROMs. Information on this catalog may be obtained from http://ad.usno.navy.mil/ucac/.





Left: The UCAC 8-inch (20-cm) Astrograph
Above: Sky coverage of the UCAC2

UCAC2 Facts At A Glance

The US Naval Observatory Twin Astrograph is used with a 4k CCD for direct imaging of the sky with guided exposures. A single frame covers just over 1 square degree. The astrometric catalog has been constructed using the Tycho-2 Catalog reference stars.

As part of the project, extragalactic radio reference sources are observed with bigger telescopes and the corresponding fields are observed simultaneously with long exposures at the astrograph.

The final UCAC catalog will have the option to tie in directly either to the fainter half of the Hipparcos stars or to some 500 extragalactic sources as an alternative reference frame to the Tycho-2 stars.

The following table gives details about the data acquisition.

number of exposures	2	per field
exposure times	25 & 125	seconds, guided
observing throughput	13	fields/hour
overlap pattern	2	fold
number of fields	85,158	all sky
sky coverage	complete	by mid 2004
sky coverage	91%	complete as of June 2003
southern hemisphere location:	CTIO, Chile	
northern hemisphere location:	Flagstaff, Arizona	
average density	1600	stars / square degree
catalog accuracy	20 mas	R = 10 to 14 mag
	30..40 mas	R = 9 mag, 15 mag
	70 mas	R = 16 mag = limit

The following table gives details about the amount of data acquired up to 10 June 2003.

Project time so far	5.4 years	1998 Feb - 2003 June
Total number of frames	243,000	including rejects
Raw data	4.0 TB	compressed FITS
Backup on	> 1100	exabyte tapes each for 2 copies
	> 6000	CDROMs (single copy)
Number of stars	> 58 million (with at least 2 images)	